KSC ELV Program

UnESS Pre-Proposal Conference

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NASA/KSC/ELV Launch Services
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KSC ELV Charter

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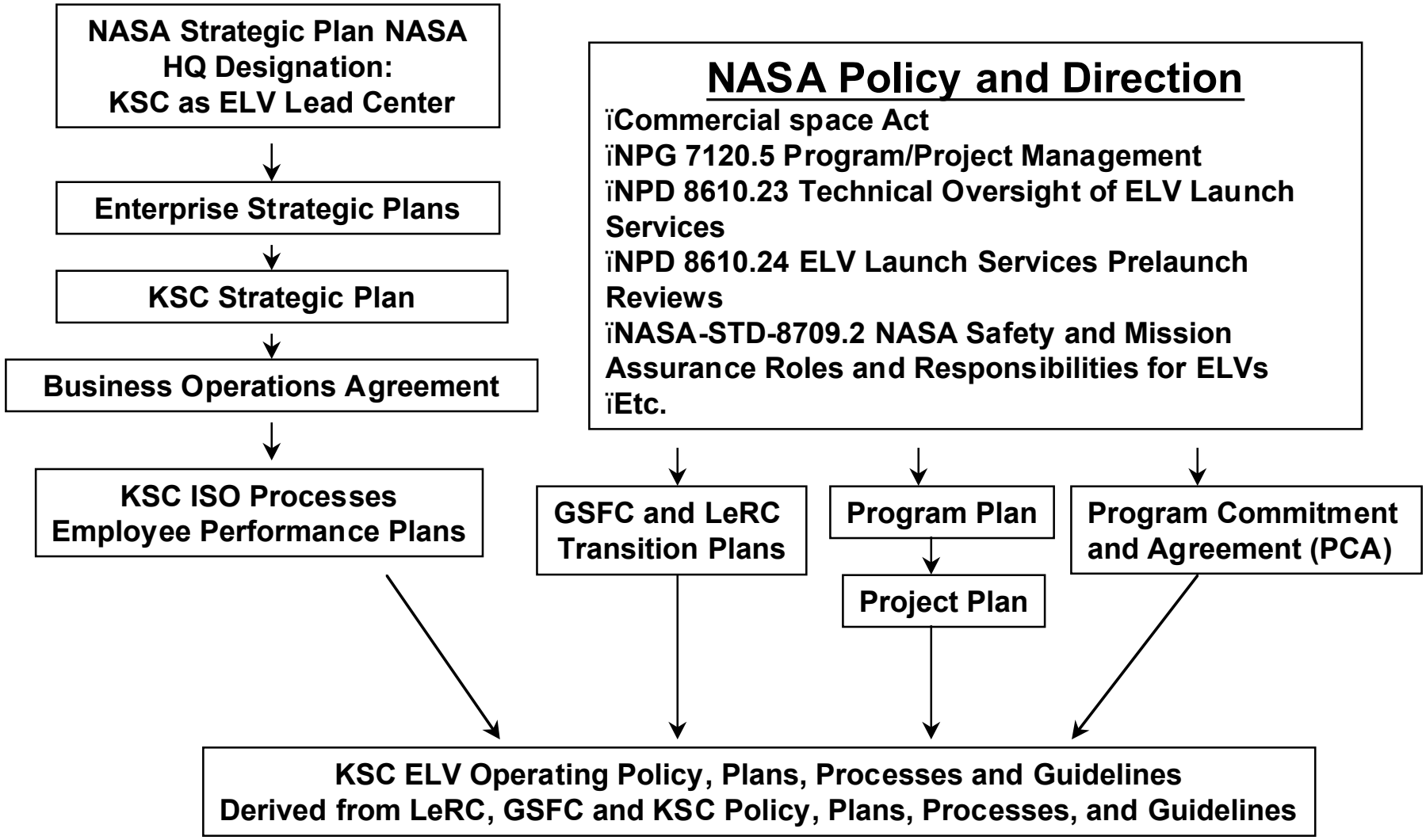
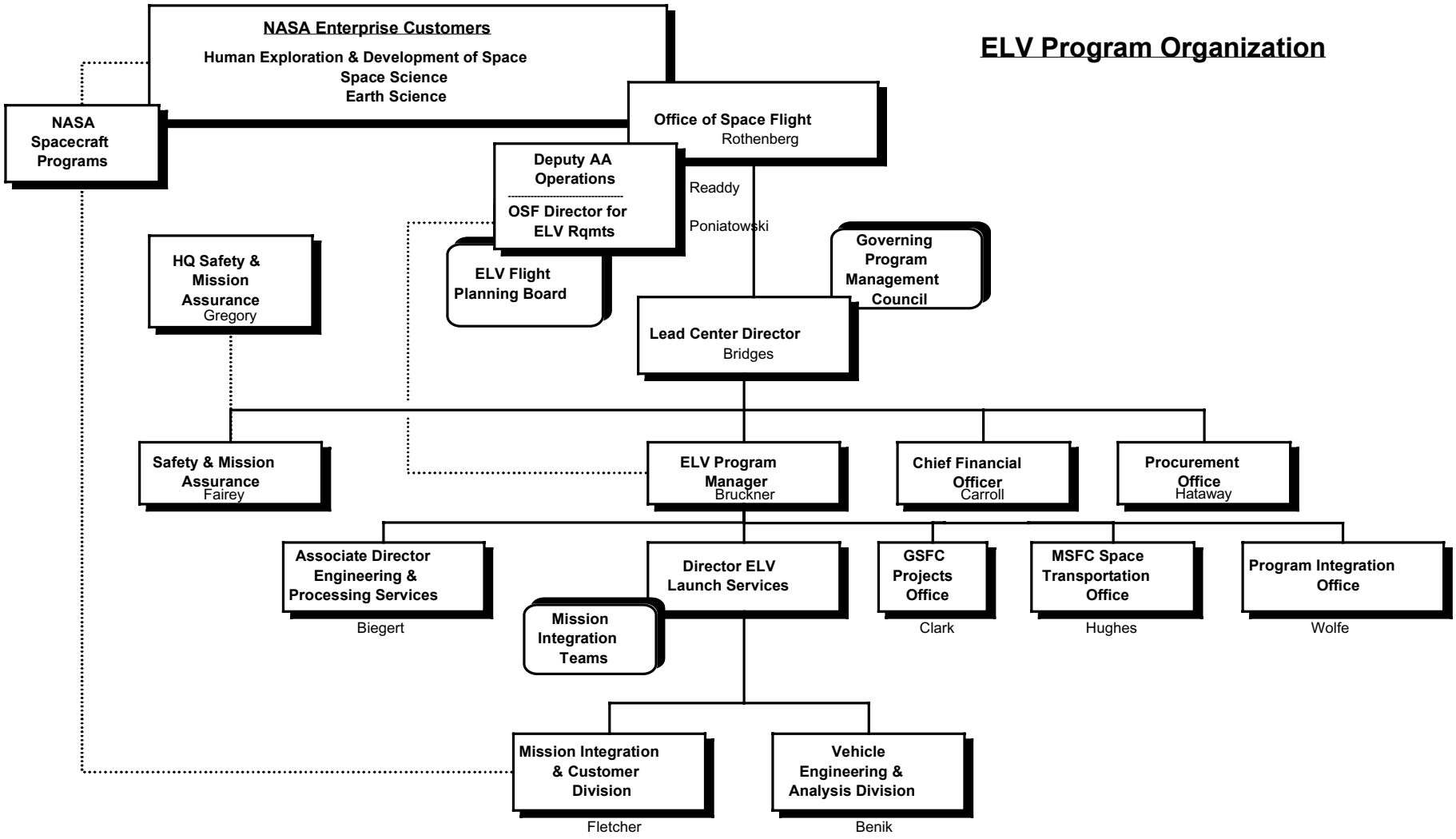


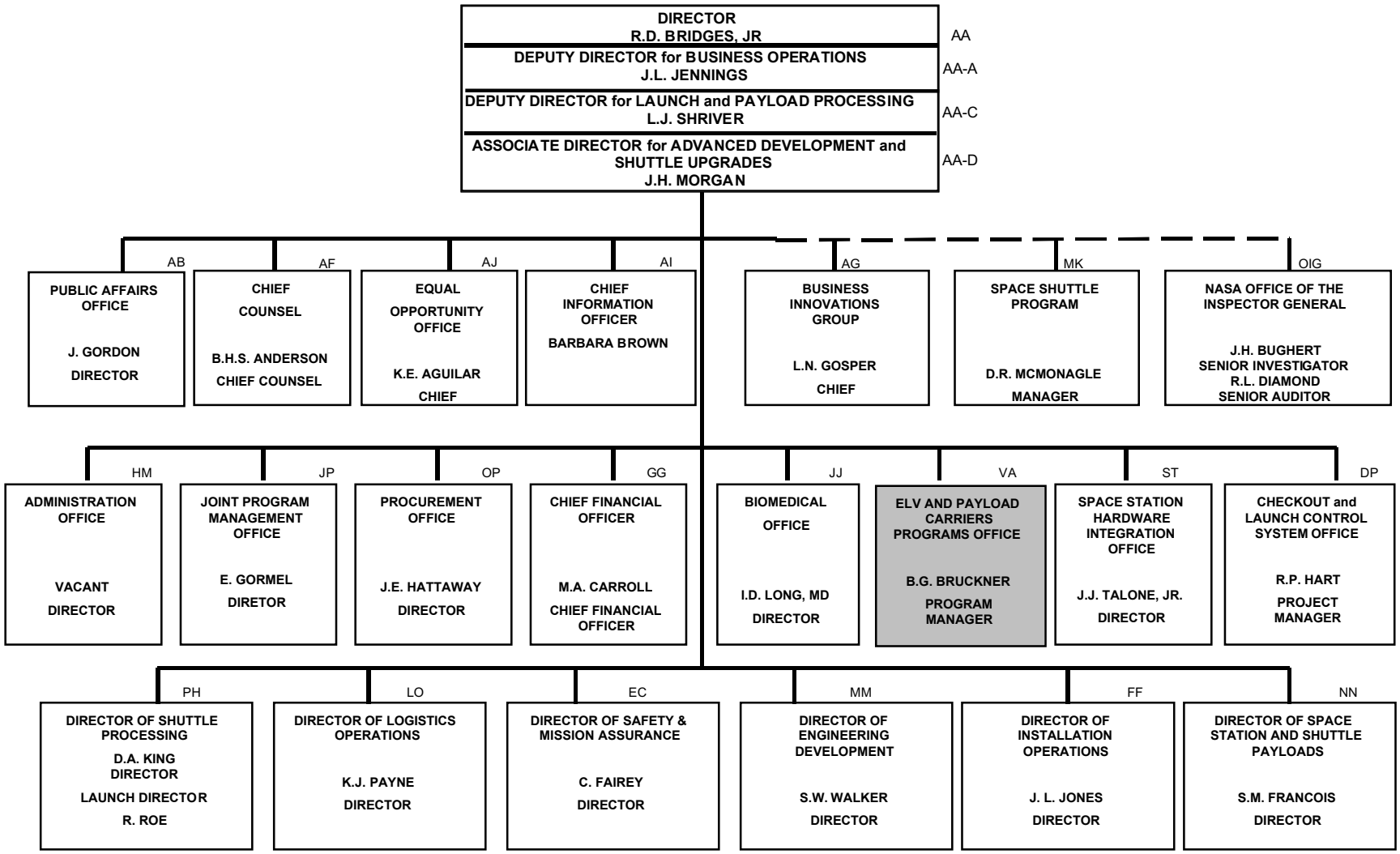
KSC Organization Overview

ELV Program Organization



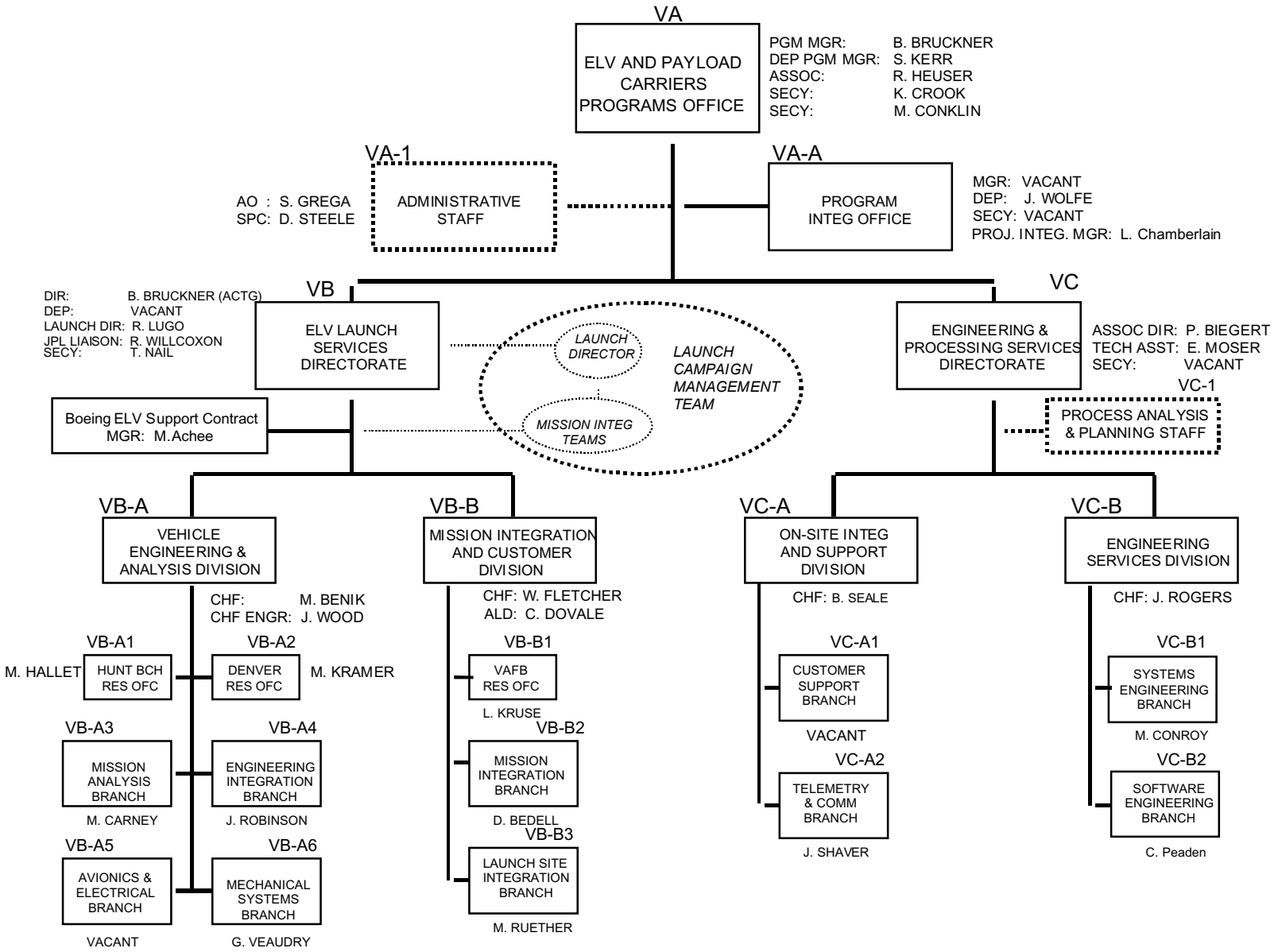
KSC Organization

EXPENDABLE LAUNCH VEHICLES



P/L Carriers & ELV Program Organization Chart

EXPENDABLE LAUNCH VEHICLES



Mission Integration

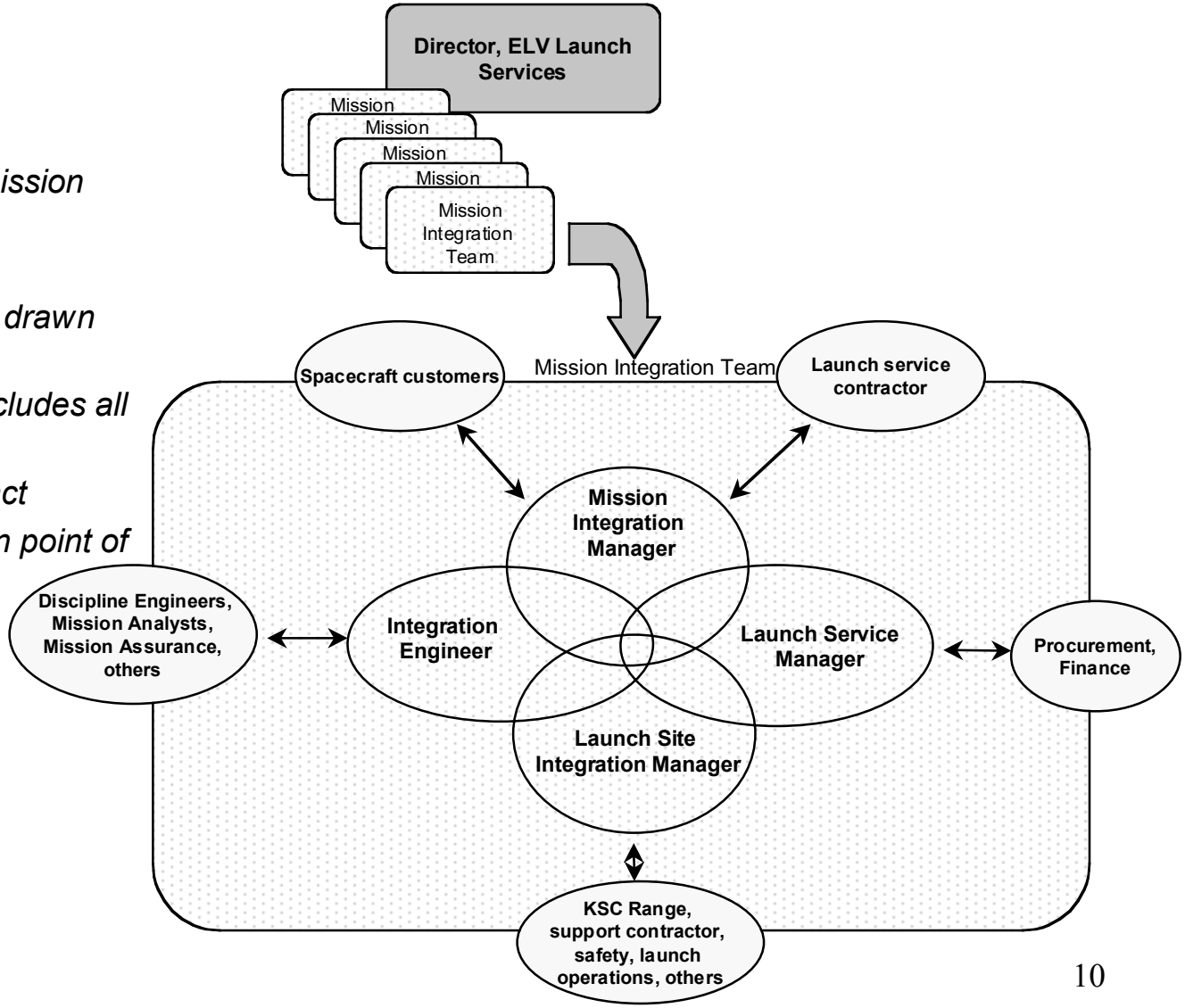
Mission Integration

- The prime objection of Mission Integration is to coordinate all interface activities required to successfully launch a payload on a given launch vehicle

Mission Integration Teams

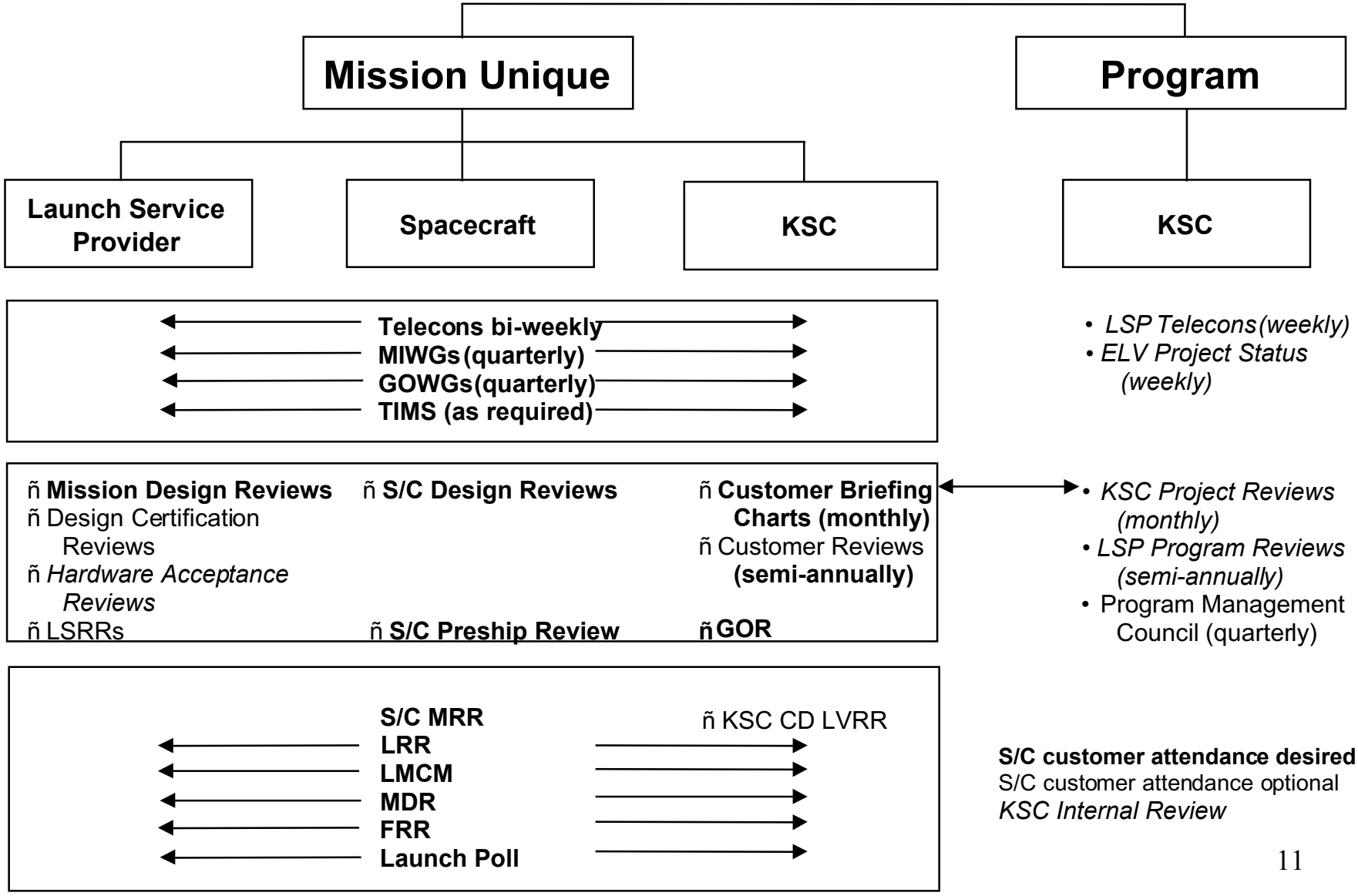
Features:

- *Total management of mission integration process*
- *One team per mission*
- *Core team membership drawn from ELV Program*
- *Expanded core team includes all other support functions*
- *Customer point of contact*
- *Launch services mission point of contact*



KSC ELV Integration/Review Processes

EXPENDABLE LAUNCH VEHICLES



Vehicle Production Insight and Mission Uniques Approval

NASA Insight and Approval

The ELV Launch Services Project performs insight and approval as defined in NPD 8610.23 to provide an independent assessment of the Launch Service Provider's products and processes in order to maximize the probability of mission success.

Insight emphasis is the "launch service" and is performed through participation in meetings, tests, data reviews, reports, inspection records, analysis, and simulations. This insight enables an understanding of the hardware, software, and management processes used in the design, analysis, test, and operation of the launch service.

Approval emphasis is on the "mission unique" elements of the launch service. The government grants approval based on the acceptance and selected IV&V of the Launch Service Provider's analysis, test, and design of hardware and software to assure that the spacecraft mission requirements are met.

NASA Insight and Approval Implementation

EXPENDABLE LAUNCH VEHICLES

Insight and approval for NASA missions is executed through a combination of civil service and support contractors. The largest portion of the support staff is located at KSC, with supporting resident offices at Huntington Beach, Denver, Pueblo and Vandenberg AFB.

The KSC staff is primarily responsible for the acquisition and management, technical integration, design, analysis, IV&V, launch site integration, and launch management of NASA launch services.

The role of the resident offices at Huntington Beach, Denver, Pueblo, and Vandeberg AFB is production, programmatic, and mission integration insight. The resident offices are staffed with a core contingent of civil servants with support contractors in critical disciplines. The resident offices are augmented by KSC engineering and mission assurance support during peak work periods and reviews.

NASA Insight and Approval Implementation

EXPENDABLE LAUNCH VEHICLES

The Vandenberg resident office engineering office is staffed by three support contractors that provide continuity and a consistent point of contact to the launch service provider. The contractor staff are not authorized to commit for this government, and this staff is supplemented by the KSC engineering and launch management team during major tests and launch operations.

In addition, the ELV Engineering Team utilizes the Hangar AE telemetry lab and launch vehicle data center to support major tests and launch operations. The team resident at KSC supports the team on-site at VAFB (or other locations) monitoring vehicle data, video, and voice nets that are extended from the launch site to KSC.

NASA Insight and Approval

- ELV Launch Services Project performs insight and approval as defined in NPD 8610.23
- Insight emphasis is the “launch service”
- Approval emphasis is on the “mission unique” elements of the launch service
- Insight and approval for NASA missions is executed through a combination of civil service and support contractors

Vehicle Insight and Approval

Scope

- Mission Unique hardware & software development
- Core vehicle fleet issues

Examples of Implementation

- Design Reviews
- ERBs
- Pedigree Reviews
- On-site surveillance (Resident Offices, Launch Site)

Launch Service Capabilities for Small Sats

- NASA KSC ELV Capabilities for Small Sats:
  - Delta II Secondary Payload
  - Pegasus Dual Payload
  - Future Capabilities:
    - > USAF EELV Secondary Payload Adapter
    - > NASA Atlas V/Delta IV Individual Secondary Payload Adapter

- Other Small Options not managed by NASA/KSC/ELV:
  - STS Hitchhiker
  - ISS EXPRESS Pallet
  - Arianne V ASAP
  - Commercial-sponsorship

Delta II Secondary Payload

- Contract mechanism is in-place with The Boeing Company
- Successful, proven Secondary Payload flight history
- Most inexpensive option
- Smallest usable envelope
- Opportunity for a ride is totally dependent on the Primary Payloads on the NASA or USAF Manifest
  - Excess LV Performance
    - > Primarys are typically sized as close to max LV capacity - limits availability
    - > LV capabilities step-up in fixed increments
      - » Primary may not have a choice but to go to the next size
      - » Typically left with excess performance
- Key Characteristics
  - East Coast and West Coast Capability in-place - low and high inclination
  - Capable of making limited orbital parameters adjustments
  - Capable of getting to higher attitude than STS
  - NASA levies constraints/limitations on the Secondary - ensure no impact to the Primary Mission
- Delta II Secondary Payload Planner's Guide for NASA Missions (1993)
  - Currently in revision, but much of it still applicable
  - Available from NASA/KSC/ELV Launch Services

Pegasus XL Launch Vehicle

- Contract mechanism in-place with Orbital Sciences Corp.
- Successful, proven flight history
- More expensive than Delta II Secondary
- Larger usable envelope
- Opportunity for a ride is totally dependent on the Primary Payloads on the NASA,DoD, and Commercial Manifest
- Key Characteristics
  - East Coast,West Coast and Kwajalein Launch Capability in-place - low and high inclination
  - Orbital parameters must be compatible with Primary
  - Capable of getting to higher attitude than STS
  - NASA and OSC work together to ensure compatible partnership
- SELVS-KSC Payload Planner's Guide
  - Available from NASA/KSC/ELV Launch Services

Future Capabilities

- EELV Secondary Payload Adapter
  - In development by USAF
  - Capable of flying 6 Secondaries on the same mission
  - Fate of this capability is uncertain
    - > Dependent on on-going studies
    - > Varying levels of interest/support within USAF
    - > No commitment yet as to which missions it will be flown on
    - > If available, NASA will likely have access to it
  - First flight targeted for late 2002/early 2003
- NASA Atlas V/Delta IV Individual Secondary Payload Adapter
  - Under study by NASA
  - Intent to develop similar capability to Delta II Secondary on Atlas V/Delta IV class
  - Fate of this capability is uncertain
    - > Dependent on on-going studies